Before the
**Federal Communications Commission**
Washington, DC 20554

In the Matter of

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| Amendment of Parts 73 and 74 of the Commission's Rules To Establish Rules for Digital Low Power Television, Television Translator, and Television Booster Stations and To Amend Rules for Digital Class A Television Stations | ) | **MB Docket No. 03-185** |

To: The Commission

## COMMENTS OF METROCAST CORPORATION

1. MetroCast Corporation (MetroCast) hereby submits its comments in response to the Commission's Notice of Proposed Rule Making ("Notice") in the above-captioned proceeding, FCC 03-198, released August 29, 2003, and published at 68 FR 55566 (Sep. 26, 2003). MetroCast is the company that provides programming to LPTV and Class A stations KBLM-LP, Riverside, CA; KMHZ-LP, San Antonio, TX; and KQUX-CA, Austin TX. These stations are licensed to the Louis Martinez Family Group, LLC, which controls MetroCast and has pending applications for four additional stations in California and Texas. The instant comments have been prepared by Louis Martinez (Martinez), principal of the Louis Martinez Family Group, LLC, and an engineer with fifty years experience in communications and broadcast engineering. Martinez also participated on the Commissions High Definition Television Advisory Committee (in Mr. Dale Hatfield's group), which helped define the technical parameters of HDTV.

2. MetroCast applauds the Commission's proposed rules and believes they will be instrumental in advancing the introduction of DTV and will certainly improve the operational and financial opportunity for both Class A and regular LPTV stations. Both these classes of station should be given equal opportunities under the new rules. MetroCast also concurs with, and

supports the comments being filed concurrently in these proceedings by, the Community Broadcasters Association (CBA), except to the extent herein set forth, and consequently will not comment on the broader issues raised in the Commission's NPRM but will instead focus on two vital technical problems that have arisen during the course of applying the Commission's technical guidelines that have developed with the introduction of DTV. The consequences of these two problems are the creation of two enormous technical "loop holes" that could (indeed have in least one instance) make a mockery of the elegance and value promised by the Longley-Rice engineering model: first, the erroneous television interference (TVI) levels defined by Commission rules (particularly second adjacent TVI level) and the manner in which this impacts the concept of permissible incremental (added) interference; and second, failure to recognize, define and enforce a practical antenna vertical pattern thereby to define realistic ratios of power-to-horizon versus maximum power tilted downward. These two issues are addressed in the following comments.

**Permissible Incremental Interference Loophole**

3. An important concept, later in effect a *de facto* Commission rule, is based on the idea that a new applicant for license or changes to existing license need not be burdened to prove their proposal causes no interference but alternatively may show, using Longley-Rice analysis, that they cause no incremental interference above that which already exists from other existing stations that potentially impacts an affected TV station. The rub, and this is the crux of the problem, is the determination of what "existing" interference actually is present. The problem is particularly severe, and the Commission's policy yields unrealistic results, where the existing interference is not co-channel, and a proponent who would cause co-channel interference claims that his

interference should be ignored because of masking by interference from a first-adjacent or UHF taboo channel

4. Predicted, Non-existent Interference. Specifically, existing the Commission's analog TV rules define first adjacent channel interference to exist if the proposed signal is stronger than 15 dB above the desired existing signal.[1] Therefore, if an applicant is granted a Commission waiver to employ Longley-Rice analysis, it could, for example,[2] "prove" the ridiculous situation wherein its proposed new co-channel signal is computed to cause 45% interference to an existing station, but where predicted adjacent channel signals (using 15 dB criteria) already causes 97% *predicted* interference to that existing station, thereby concluding that its proposed new incremental TVI adds nothing, so its application should be granted. The facts of this example, however, clearly demonstrate that none of the predicted 97% adjacent channel interference to the existing station has ever been detected or reported; and it is patently obvious that the 15 dB criterion, as applied in this example, is clearly unrealistic.

5. Proven Field Experience**.** Two experienced engineers have independently proven through field and laboratory experiments that adjacent channel interference ratios in practical situations (in this case in the Los Angeles and New York city markets) is closer to 30 dB (1000 times stronger), rather than 15 dB (32 times stronger).[3] A ratio of 1000 to 1 compared to a ratio of 32 to 1 makes a world of difference and is the reason that so many LPTV stations have found

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[1] However, Commission OET Bulletin 69 defines TVI to exist if a signal one channel above is stronger than 13 dB, or if it is one channel below and is over 3 dB relative to the affected channel.

[2] This is an actual case involving proposed minor modification of station KNET-CA and existing co-channel station KBLM-LP; see filings related to application BMPTTA-20021126ABM.

[3] *See* attached affidavits of Louis Martinez and Richard Bogner, attached as Exhibits A and B.

refuge in recent adjacent channel co-location station grants in which the Commission has given *de facto* recognition to this practical solution by granting those new channels, even though application of the existing 15 dB TVI criteria would predict those new channels to be worthless because they would suffer very high *predicted (phantom)* interference when in fact there is none, or acceptably little. That *de facto* Commission recognition is welcome; but on the other hand, permitting that same 15 dB *phantom* criteria to be recognized as real, and thereby authorizing new co-channel signals to come on the air because they add nothing to that *phantom* adjacent channel interference, would be a disaster, because the new co-channel signal is not a *phantom*.

6. The Commission Must Adopt Heuristic Standard. New applicants proposing minor modification should be required to meet either long-standing Commission Rules governing interference between analog-to-analog TV stations, the so called Grade A contour method, or alternatively; if using Longley-Rice analysis, must show by at least some measurements that the interference they predict to exist does indeed exist. The Commission should not routinely grant use of Longley-Rice methodology because that methodology has not received sufficient testing in legal or technical forums to prove its reliability. In particular, the interference predicted to exist clearly does not exist in some important adjacent channel cases as described above. To allow application of Longley-Rice in the uninhibited manner proposed in the above example is to open a large loophole that will be detrimental to the many co-located displacement adjacent channel stations granted in the last three years that could be swamped by proposed future co-channel applications that rely on hiding under predicted interference that does not exist. In short, Longley-Rice is a welcome tool to compute signal levels and ratios, but not for showing where interference actually exist. Finally, in the interest of being more lucid and candid, and respectful of the seriousness of this matter, it is useful to compare this situation to two meteorologist

arguing over how hard it is currently raining over wide spread areas as predicted by their computer formulas; and neither of whom is inclined to just open the window and see what is happening outside.

**The Antenna Vertical Pattern Loophole**

7. Power Radiation toward Horizon. Commission interference computations are based on power radiated toward the horizon. It is only in recent years that power radiated at other vertical angles has become of interest, but only in a secondary fashion because power to horizon still governs the Commission's thinking. In fact it may seem startling to many that a UHF station granted a construction permit[4] for say 575 watts to horizon could quietly and unilaterally increase that power somewhat to over 125,000 watts tilted downward simply because that higher power does not enter into interference computations made by the Commission, hence causes no "legal" interference, even though common sense should make one suspect 125,000 watts ought to cause more interference that 575 watts. Beyond this, it takes more than common sense, as explained below, to realize that such a combination of power to horizon and power titled downward is not even physically realizable…it cannot be done in practice, even though it would be admissible by Commission Rules. This is indeed a large loophole in the Commission's Rules.

8. Vertical Pattern Guideline. OET Bulletin 69, Section II EVALUATION OF INTERFERENCE, specifies in Table 8: Vertical Pattern Assumed for Transmitting Antennas, the pattern to be used for interference evaluation purposes such as discussed here. Unfortunately this is only a guideline and is not mandatory. Specifically, for UHF analog stations, Table 8 shows that antenna gain rolls off smoothly (no nulls) from -9.6 dB at 2.5 degree to –16.5 dB at 4 degrees off the main beam axis. No nulls are recognized, at least in part because deep nulls are

[4] *See* again filings related to application BMPTTA-20021126ABM for KNET-CA.

difficult to specify precisely before antenna installation, or to control in the field. Therefore even if antenna tilting is used, a station radiating 125,000 watts tilted would still effectively transmit 4,300 watts to the horizon pursuant to rules set forth in Table 8 standard -- obviously much higher than the 575 watts noted in the above example, thus illustrating the example station is not realizable under the guidelines. Even aside from Table 8, It is well understood engineering knowledge that a uniformly illuminated vertical antenna aperture as commonly used in LPTV will result in first vertical sidelobe level –13 dB below main beam, and this results in power in excess of 7,500 watts to horizon in the above example, so it is not obvious one can attain in actual practice very low off-axis power of say 575 watts for a 125,000 watt main beam.

9. The Deep Null Loophole**.** Alternatively, there is a theoretical loophole wherein an applicant may attempt to tilt the beam down so as to place the horizon at the first null in the antenna vertical pattern, and that null could theoretically be as deep as 24 dB (262:1 ratio) as required for the example case described above; but that would require manufacturing, installation and maintenances tolerances far too precise to be practical and might require a Commission waiver to circumvent use of OET Bulletin 69 standards. But even if a waiver were granted, it would be necessary for applicant to demonstrate how it could in practice provide the very high degree of precision necessary to operate within the first pattern null at the precise angular offset point required. In fact computations clearly illustrate,[5] for a typical 16 bay UHF antenna (computed using well known Numerical Electromagnetic Code "NEC" software frequently used in antenna design) that the ERP for a 150,000-watt main beam, in the first null region, falls from 2,500 watts to near zero in range from 3 to 3.4 degrees off-axis. Attached exhibit C shows the ERP error (in %) if one deviates from the required 3.2007º offset for 575 watts for example

[5] *See* attached Exhibit C.

station. For instance, a ±0.05º alignment error results in a ±50% ERP error. To hold a 10% ERP tolerance, normally met by most TV stations, would require 0.01º accuracy if one is to employ the loophole discussed here; and that precision is impractical to build or to maintain. Furthermore, it is unlikely that any antenna manufacturer will specify or warrant either the precise physical location of this 575-watt ERP "angle" or its stability during or after installation. Moreover, and more important, local ground scatter will exceed and swamp the 575-watt level toward horizon and prevent measurement and verification of specified 575-watt power level in the field. It is that stronger forward ground scatter that propagates toward other co-channel stations and interferes with them, particularly if the offending station's transmitter is at a higher elevation.

10. A Standard Vertical Pattern is Necessary. To summarize, in pursuit of higher ERP, it will be tempting for applicants to rely on an unbuildable, unverifiable null loophole to claim they have constructed a low ERP-to-horizon station when in fact actual ERP toward the horizon, and in any direction, will be considerable higher power for cases that differ significantly from the OET Bulletin 69 specified vertical pattern. Therefore applicants should not be allowed to circumvent OET Bulletin 69 vertical pattern standards without a waiver unless they can demonstrate how they will verify and maintain what they claim to have built.

11. Conclusion. While there will no doubt be more loopholes uncovered in the future, the two loopholes discussed here are most glaring and should be dealt with if we are to minimize interference between TV stations and provide the orderly transition to DTV that every one desires. To permit unchallenged engineering excursion into unrealizable, though "legal," proposals, would undermine the work of the many serious engineers dealing with real world designs. It is up to the Commission to apply realizable standards and guidelines wherever

necessary, particularly the two cases discussed here. In the alternative, applicants should be required to prove their design the old-fashioned way…by actual measurements, not by using legal loopholes. In any case, the Commission should not attempt to stifle innovation, since the promise of new technology improvement indeed warrants some risks, but that option is held open in the instant Notice of Proposed Rule Making…and that is a breath of fresh air.

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Respectfully submitted

/s/ Louis Martinez
Louis Martinez

November 25, 2003

**EXHIBIT A**
(Conformed Copy)

# AFFIDAVIT OF LOUIS MARTINEZ

This statement was prepared by Louis Martinez (BS PHYSICS, electronics option, Wayne University, 1955). In period 1955-60 Martinez was an engineering manager for radar and ECM systems first with Bendix Research Labs, then Motorola Systems Laboratory where he conducted and supervised R&D projects. In period 1965-75 he was on the staff of the Aerospace Corp (non-profit think tank for USAF) where he headed Electromagnetic Concepts & Plans Group, later represented Justice Dept (LEAA) as liaison with the FCC. Since that time Martinez has managed his own R&D companies focusing on wireless data transmission systems, particularly in RF bands co-channel or adjacent to TV channels. He holds 17 patents in this technology, most assigned to his company Radio Telecom & Technology (RTT).

While president of RTT he supervised both laboratory and field tests evaluating the nature and magnitude of television signal interference arising from data signal transmissions on vacant adjacent TV channels. The results of many of these tests can be summarized as follows:

1. The selectivity of TV receivers manufactured in the past twenty years typically suppress adjacent channel data transmissions by 30 dB or more. This suppression is primarily due to selectivity of receiver IF amplifiers, but also because of the integrating effect of display phosphors on the screen of the display CRT tube. The latter effect causes non-coherent signals (e.g. data/video not in sync with TV signal) to be incoherently added or subtracted, while the intended coherent video is constructively added together, thus giving greater visibility advantage to the preferred TV signal.

2. Assuming the interfering signal is not strong enough to overdrive or saturate the TV receiver front end or IF circuits, and the TV receiver operates in a linear mode, then the 30 dB adjacent signal suppression figure noted above should be expected. The TV receiver AGC was generally controlled by the stronger signal and that has the added effect of increasing or decreasing receiver sensitivity and level of susceptibility to foreign signal effects

3. In laboratory trials, interference was measured subjectively using human observers who where asked to determine the threshold value where the foreign (interfering) video was first detected in the presence of a preferred TV signal. That level of foreign signal was controlled by the test conductor and recorded.

4. RTT was a major producer of systems for the FCC Interactive Video and Data Service (IVDS) in the mid 1990's. Those systems operate on an RF channel adjacent to TV channel 13 and minimizing TV interference is a major consideration. Some of the tests referred to here were conducted pursuant to FCC Experimental License and some of the findings where incorporated in revised IVDS rules promulgated by the FCC. The tests, and patented products referred to above never caused interference to TV receivers.

I hereby declare under penalty of perjury that the foregoing Statement was personally prepared by me and is true and correct to the best of my knowledge and belief.

Executed at Riverside, California, December 26, 2002.

Louis Martinez

EXHIBIT B

**Affidavit of Richard D. Bogner**

This statement was prepared by Richard D. Bogner (B.E.E. magna cum laude 1948; M.E.E. 1950; Polytechnic Institute of New York). My technical qualifications are also a matter of public record before the FCC. From 1967 – 1990, I was President of Bogner Broadcasting Equipment Corporation, a leading manufacturer of broadcast TV antennas and since 1980, I have been Managing Partner of Island Broadcasting Co. ("Island"), which is the licensee of 4 LPTV stations licensed to New York City, New York:

WNXY-LP, Channel 26

WXNY-LP, Channel 32

WNYX-LP, Channel 35

WNYN-LP, Channel 39

1. I have been requested by James J. Chladek ("Chladek"), licensee of WPMF-LP, Miami, Florida to assist his consulting engineer, Clarence M. Beverage, by relating to the FCC my first hand experience over the years conducting tests on interference from full service analog TV stations to the signals of first adjacent channel LPTV stations located within the full service Grade A contour of the LPTV stations. This is precisely the situation which exists between WPMF-LP, Channel 38 and WBZL-(TV), Channel 39, Miami, Florida which has filed a Petition to Deny the above-referenced WPMF-LP, Channel 38 displacement application.

2. Sections 74.705 (d)(4), 74.707 (d)(4), and 73.613 (g)(4) of the FCC's rules each state that in the case of adjacent NTSC Channels, interference is considered to begin when the signal strength of one channel is more than 15dB above that of the other channel. OET Bulletin 69, however, states that in a Longley-Rice analysis, interference from an upper adjacent channel to a lower adjacent channel occurs when the upper channel is 13dB or more stronger than the lower channel; while interference from a lower adjacent channel to an upper adjacent channel occurs when the lower channel is only 3dB stronger than the upper channel.

3. When Island commenced operation of stations WNXY-LP, Channel 26 and WXNY-LP, Channel 32, each at 25 kW peak ERP dropping to less than 5 kW ERP in parts of their coverage area, it was recognized that nearby were adjacent channel NTSC stations WNYE, Channel 25 and WPXN, Channel 31, with ERP values in the 2500 kW range. Thus, these two full service stations were over 20dB above Island's two LPTV stations in most areas. In both of these cases, the stronger channel was the lower adjacent one and therefore, interference is predicted by OET 69 when the full service station is a mere 3dB stronger than the LPTV station. Despite this, WNXY-LP, Channel 26 and WXNY-LP, Channel 32 have been in operation for a long period of time with no sign of interference received (or caused).

4. I performed a number of studies throughout the coverage area of WNXY-LP and WXNY-LP using a spectrum analyzer and various size, make and quality TV receivers.

The studies in question involved measuring the relative signal strengths of the two adjacent NTSC channels and viewing the TV picture and sound of both stations to determine whether or not any interference could be observed. In no case was any interference observed when the stronger signal was less than 32dB above the weaker signal for these two instances where the stronger channel was the lower adjacent channel. Since OET 69 allows an additional 10dB (13 dB vs. 3 dB) for the case of Channel 39 interfering with Channel 38 in Miami, the measured data should certainly be applicable. Thus, it can be concluded that the value 15 dB in the above stated FCC rules, or the value 13 dB in OET 69, can be replaced with the value 30 dB safely in this case.

5. In sum, instead of the 15dB interference value used in the above-referenced FCC rules and the 13 dB used in Longley-Rice analysis, the value of 30 dB would be more appropriate as an interference value with current TV receiver designs.

The statements herein are true and correct of my own personal knowledge.

By: Richard D Bogner

Richard D. Bogner

Duly Subscribed to and Sworn before me this 20th day of November, 2002

Notary Public

Dolly M. LaFuente
Notary Public, District of Columbia
My Commission Expires 11-14-2006

# EXHIBIT C

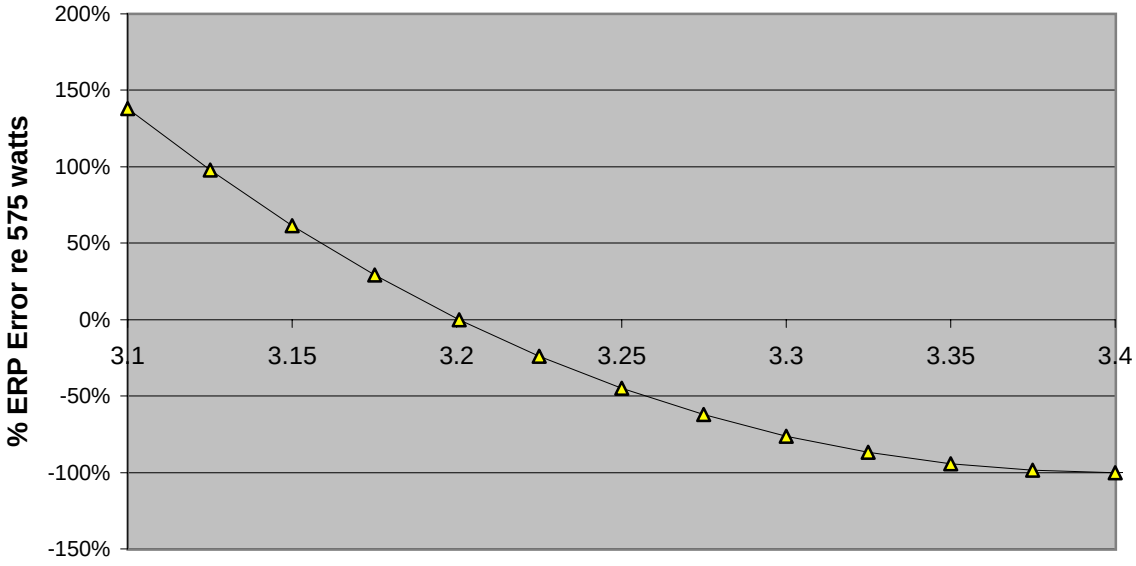


**Fig A-1, Elev. Angle, Deg (575 w = 3.2007 deg)**

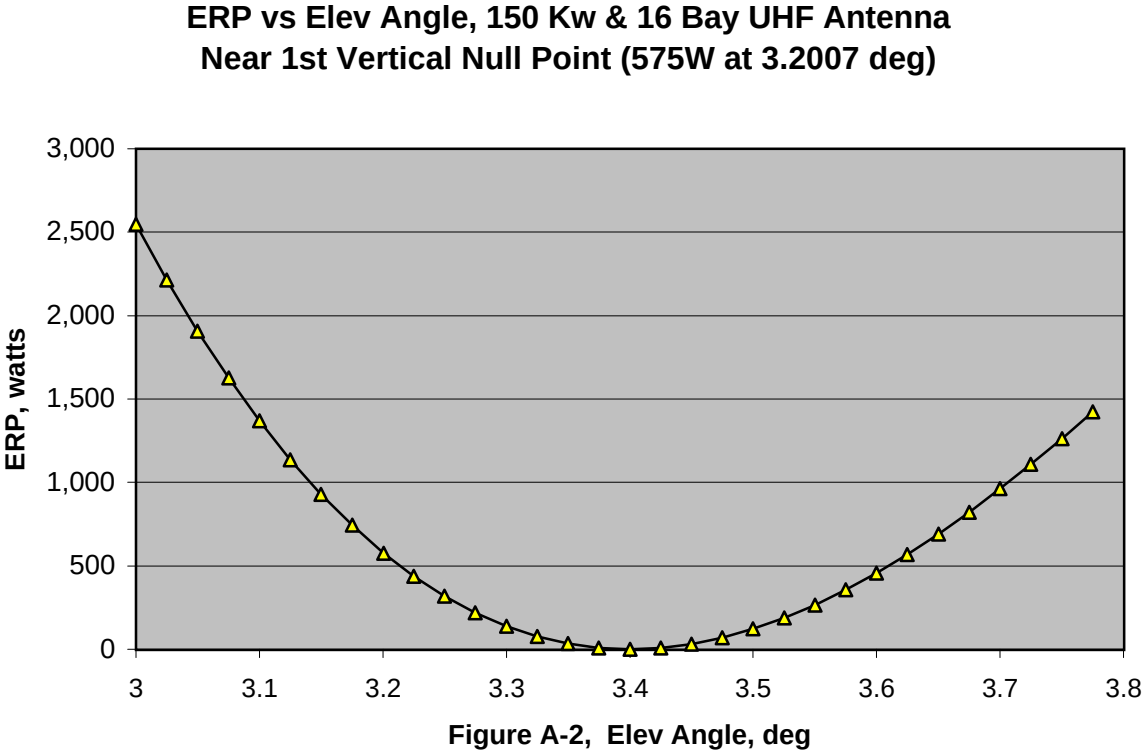


**Figure A-2, Elev Angle, deg**

## CERTIFICATE OF SERVICE

I, Daniella K. Mattioli Knight, do hereby certify that I have, this 25th day of November, 2003, caused a copy of the foregoing "Comments of MetroCast Corporation" to be sent by first-class United States mail, postage prepaid, to the following:

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Counsel for Station KNET-CA

Daniella K. Mattioli Knight